

# TECHNICAL EDUCATION AS A TOOL FOR ENSURING SUSTAINABLE DEVELOPMENT: A CASE OF INDIA

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## ABSTRACT

This paper notes that education needs to essentially lead to sustainable development serving two-fold purpose – eradicating the problems of unemployment and poverty; and ensuring equitable distribution of wealth while ensuring the right understanding leading to a peaceful, prosperous and developed world. In its current state, technical education doesn't seem to serve the above two objectives. The paper presents a holistic view of technical education in India. In order to ensure sustainable development for India in the contemporary global scenario, the paper finds technical education to be one of the core competencies that need to be developed. The paper observes that there seems to be no linkage between the 'education' being provided in the country and these problems getting solved. In order to provide a real educational solution for all-encompassing development of India, the paper suggests that 'what to do' is the real question for technical education than just 'how to do'. The paper suggests a model for the State (province) of Punjab in India to elaborate on the model of technical education for sustainable development.

## KEYWORDS

Sustainable development, unemployment, poverty, technical education, what to do, how to do

## 1. INTRODUCTORY REMARKS

Einstein maintains that the aim of education must be the training of independently acting and thinking individuals who see in the service to the community their highest life problem (Seelig 1954). Drawing inferences from the statement of Einstein, one can clearly state that the ultimate purpose of education is in ensuring service to the society in achieving the goal of the masses. The goal of every human in this world seems to be happiness (European Economic and Social & Committee 2008) and its continuity (Nagraj 2011). The objective of education is to facilitate the attainment of human goals by ensuring the right understanding among humans (Nagraj 2008), thereby ensuring the happiness for every individual at the levels of self, family, society and nature (Gaur et al. 2009). Such education will lead to sustainable development serving two-fold purpose – one, it will help eradicate the problems of unemployment and poverty; and two, it will ensure equitable distribution of wealth while also ensuring the right understanding leading to a peaceful, prosperous and developed world.

UNESCO (2016) defines sustainable development as an organizing principle for global development that supports the well-being of both people and the planet. The term encompasses environmental, economic and social concerns, attempting to investigate environmental protection and ecological integrity, economic viability, and social and human development. Nagraj (2009) goes a step further and maintains that only the development at the levels of self, family, society and nature can be sustainable for mankind.

Focusing on the technical education scenario in India, this paper brings out that in its current state, technical education doesn't seem to serve the above two objectives. The paper goes on to suggest the route for development of technical education system for ensuring sustainable development in India. The paper suggests a model for the State (province) of Punjab in India to elaborate on the model of technical education for sustainable development.

## 2. EDUCATION AND SUSTAINABILITY

Sustainable development is the one that meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainable development requires meeting the basic needs of all and extending to all the opportunity to fulfill their aspirations for a better life (Brundtland 1987). Brundtland (1987) further argues that sustainable global development requires humans to adopt the lifestyles that are in synchronization with the planet's ecological means - in their use of energy. United Nations (1992) suggests 21 principles of sustainable development that largely deal with healthy and productive life in harmony with the nature; right to equitable development; eradication of poverty; environmental protection; quality of life; and women empowerment etc.

The concept of education cannot be confined to what happens in the classrooms. It extends to the daily and professional lives as well (UNESCO 2012). Therefore, education has to play a role in improving the lives of people in such a way that they live in harmony with other humans as also with the rest of the nature (Nagraj 2008).

There is immense literature that studies the role of education in development. However, a limited number of studies discuss the role of education in sustainable development (Basant & Chandra, 2007; Brundtland, 1987; Dyankov, 1996; European Economic and Social & Committee, 2008; Harmon, 2011; Kaul, 2006; Kemal, 2005; Krueger & Malečková, 2003; National Knowledge Commission, 2009; OECD, 2006a, 2006b; Ramani, 2014; Roy, 2012; Seelig, 1954; Tilbury, 2011; UNESCO, 2012; United Nations, 1992; Universities UK, 2002; Vrat, 2009).

Nagraj (2008, 2011) establishes that the real test of education is whether it gets the humans to understand the importance of relations (with other humans and the rest of nature) and facilities. In its current form, most of the education systems accelerate the blind race to accumulate more and more facilities and nearly ignore the relationship aspect. This is precisely the reason why current education system does not provide sustainable solutions to the problems of mankind (Nagraj 2009; Nagraj 2008; Gaur et al. 2009). An alternate education system needs to be developed – such that it focuses on developing the holistic understanding among humans. Such alternate shall provide solutions that cater to the problems of the locale and builds on the locational advantages prevalent in the area.

## 3. PRESENT STATE OF INDIAN HIGHER EDUCATION

Education is one tool that has to play significant role in building a strong workforce in the country, which gels well with the national objectives. Providing access to knowledge is the most fundamental way of increasing the opportunities of individuals and groups. Therefore, it is essential to revitalize and expand the reach of knowledge in society (National Knowledge Commission 2009).

The goal of technical education is to play a vital role in human resource development of the country by creating skilled manpower, enhancing industrial productivity and improving the quality of life. Technical education covers courses and programmes in engineering, technology, management, architecture, town planning, pharmacy and applied arts & crafts, hotel management and catering technology.

Basant & Chandra (2007) reveal that the Indian experience in developing and regulating technical education has had an immense impact on the development of public and private enterprises in the country. The paper also uncovers that the key advantage of this regime has been the development of very diverse capabilities in manpower, thereby helping India diversify its industrial base. On the other hand, Vrat (2009) observes that the current scenario of technical education is a cause for concern, particularly on quality and employability front. It is necessary for the improvement of technical education in India that all stock holders should contribute towards the goal of making India a leader of knowledge of shared perceptions and concerns.

The higher education system in India has grown in a remarkable way, particularly in the post-independence period, to become one of the largest systems of its kind in the world. However, the system has many issues of concern at present, like financing and management including access, equity and relevance, reorientation of programs by laying emphasis on health consciousness, values and ethics and quality of higher education together with the assessment of institutions and their accreditation (UGC Golden Jubilee Seminars- 2003). India has to rise to the occasion urgently and reorient its higher education system to

be vibrant, competitive, meaningful and purposeful; besides, there is absolutely no substitute to quality of higher education, although the country has been faced for a long time with the serious problem of meeting the quantity needs of our society. It is, therefore, essential that a careful balancing of the two is given priority to meet the twin requirements of the society in the foreseeable future (UGC Golden Jubilee Seminars- 2003).

There has been a rise in the number of educational (particularly technical) institutions operating in the country. The number of universities has increased (since independence) 33 times (666 universities as on 31st March 2014 as compared to 20 in 1950), the number of colleges – 79 times (39,671 colleges as on 31st March 2014 as compared to 500 in 1950), and the student enrolments have increased 113 times (237.65 lakh students as on 31st March 2014 as against 2.1 lakh students in 1950) since independence (UGC 2014).

Despite the increase in numbers of universities, colleges, and student enrolments, the higher education sector of the country has not been able to yield the desired results (UNESCO 2016). Education is essentially linked with human development. Any development in the educational facilities in the country needs to get reflected in the human development in the country. India, however, still lags far behind the other developing and developed countries in terms of Human Development Index. For 2013, the Human Development Index for India (ranked 135) stands at 0.586, while the same in Brazil, Russia, China, South Africa, Indonesia, USA, UK, and Japan is recorded at 0.744, 0.778, 0.719, 0.658, 0.684, 0.914, 0.892 and 0.890 respectively (United Nations Development Programme 2014).

One of the major reason for slow progress in the field of Human Development Index in India remains the employability concern. Table 1 summarizes the employability percentage of India engineering graduates in different roles (Aspiring Minds 2016).

Table 1. Employability Percentage of Engineering Graduates in Different Roles

Role	Employability
<b>IT Roles</b>	
Software Engineer – IT Product	3.67%
Software Engineer – IT Services	17.91%
Startup Ready – IT Services	3.84%
Associate – ITeS Operations (Hardware and Networking )	37.06%
<b>Engineering Roles</b>	
Design Engineer – Non IT	6.56%
Sales Engineer – Non IT	19.08%
<b>Non-tech Roles</b>	
Business Analyst – KPO	10.86%
Associate – ITeS/BPO	40.57%
Technical Content Developer	11.66%
Creative Content Developer	16.72%

(Source: Aspiring Minds)

The major reasons for unemployability in India may be attributed to the following factors in addition to other factors being reported by various studies/ reports.

### **3.1 Quality of training of Technical Graduates passing out of Indian Institutes is not of Global Standards**

Students of Indian technical Institutes are trained on the software and operating systems of Microsoft, Oracle, Sun, Macintosh, etc. The teachers of Indian institutes are not trained well as these multinational companies don't have direct industry-institute interactions with the Indian educational institutions. On the other hand, teachers of the first world have direct access to these corporate for training and R & D purposes. Thus, they are far more skilled to train their respective students.

### **3.2 Expansion of Technical Education is not in the area where India can build an Advantage**

India has a competitive advantage of having a vast geographical area having different climatic conditions ranging from sub-zero to high temperature (say 50 degree Celsius) having regions of moderate to very heavy

rainfall with soil of different textures and different topographies. All these conditions provide a perfect ground to grow and develop the eatables ranging from spices, tea, fruits, and all sort of other foodgrains including dairy products for whole of the living creatures of the world. The technical education of the country needs to be expanded in such a way that it helps us in developing this crucial sector. The Computer, IT, Electronics, Biotechnology, Mechanical, Chemical, Civil Engineering coupled with different spheres of Management should be planned in such a way that the application of all these subjects is directed at developing the competitive advantage of the country. For example, Chemical and Bio-technology could be used to develop latest seeds and insecticides and pesticides. Presently, multinational companies like Bayer, Dupont etc are selling this product in the market. Similarly, mechanical and civil engineering techniques may be used for better irrigation while Management and IT could be used for information and marketing in the farming sector, which could help in the export of these commodities.

### **3.3 Placements of the Graduates are Dependent upon the Multinational Companies of the First World**

In most of the educational streams, the graduates passing out of Indian education system are dependent on the multinational companies for their employment. Educational system of the country, not being able to produce graduates who can use their education to encash upon the geographic dividend available with India, leaves no other option but to look towards the MNCs. Any alternate educational model needs to focus on producing graduates who can do what they are good at, rather than what others (MNCs) are good at.

While on one hand, the increase in number of enrolled and passing-out students in the country has failed to increase the level of employment (Basant & Chandra 2007; Vrat 2009); on the other, the social problems of the country have touched new heights (National Crime Records Bureau 2015). The increase in number of crimes and suicides has been visible despite the increased number of students getting through the education system of the country.

The spread of education without being able to get the employment level rose in the country, on one hand; and without making any significant contribution to resolving the problems of the masses, on the other; merely seems to be the spread of schooling and not that of education.

## **4. VISION FOR INDIAN TECHNICAL EDUCATION IN CONTEMPORARY GLOBAL SCENARIO**

Indian technical education must aim at overall development of the country by involving the development of all sections of the society including the services sector, industry sector, and agriculture sector. This would only be possible if the goals of technical education in the country are set-up in synchronization with the demographic characteristics of the country. The problem with countries like USA that are gripped with recessionary patterns currently, has been that only the technical know-how has been present in those countries while the other factors such as production, engineering, marketing, management have all been outsourced to other countries like India, China, Russia and Brazil. The Indian demography is strong and versatile enough to manage all these functions in-house leading to a solid competitive advantage. Therefore, there is a strong case for developing the technical education in India in line with the competitive advantage for the country in the global economy.

Mere imparting the skills (that are being imparted globally) does not fulfill this requirement. Technology being taught by present technical education system of the country only tells us 'how to do the things' without actually knowing 'what to do', which is far more relevant a question (Gaur et al. 2009). The vision for future of Indian technical education ought to start with knowing and deciding 'what to do with technical education'. This question needs to be addressed keeping in mind the needs and competencies of the Indian citizens. Since agriculture is the core strength of India, the Indian model of technical education shall target at exploring this core strength. All the streams of technical education shall be developed in a way that helps strengthen the agricultural economy of the country. This is the 'what to do' part on the basis of which 'how to do' can be worked out.

There are examples present in the Indian education system itself where the technical programs customized as per the competitive advantage and needs of the country, emerged amazingly successful and served the purpose at all the four levels mentioned before. The post-graduate programs in agri-business management being offered by Institute of Rural Management, Anand (Gujarat) and Indian Institute of Management, Ahmedabad, are two of the significant examples that can be cited wherein the customization of higher education programs according to the competitive advantage of the country have produced great results at all the four levels. *One*, the equipped manpower produced by these programs has been grabbed by the industry with both hands leading to the happy and prosperous 'self' of these technocrats. *Two*, the placements of these graduates have been in their own State/ Country, thereby minimizing the need to migrate overseas unlike the Computers/Electronics/IT engineers, leading to happy and prosperous 'families'. *Three*, they are also serving the Indian 'society' by guiding the farmers. *Four*, they are involved in improving the production and quality of food-grains without exploiting the natural resources or the human beings, and this production is in harmony with the 'nature'.

## 5. POTENTIAL OF TECHNICAL EDUCATION FOR ENSURING ALL-ENCOMPASSING DEVELOPMENT – A CASE OF PUNJAB

Before moving on to discuss the potential of technical education for ensuring all-encompassing development with the example of Punjab, the paper presents table 2 and 3.

Table 2. Minimum support prices of foodgrains in India

Marketing Season	MSP of Wheat MSP+Bonus	MSP of Paddy			MSP of Coarse grains
		Common + Bonus	Grade A + Bonus	Jowar/Bajra/ Maize/Ragi	Barley
2007-08	850	745	675	600	565
2008-09	1000	900	930	840	650
2009-10	1080	1000	1030	840	680
2010-11	1100	1000	1030	880	750
2011-12	1170	1080	1110	980	780
2012-13	1285	1250	1280	1500	980
2013-14	1350	1310	1345	1500	980
2014-15	1400	1360	1400	1530	1100
2015-16	1450	1410	1450	1570	1150
2016-17	1525	1470	1510	1625	1225

(All MSPs are Rs/quintal)

(Source: Department of Food and Public Distribution, Govt of India)

Table 3. Subsidies to agriculture in India during Tenth and Eleventh plan

Plan Period	Year	Budgetary subsidies (CSO)	Food Subsidy	Total Fertiliser subsidy	Subsidy on Indigenous Urea	All Other Agriculture Subsidies	Total agriculture related subsidies
Tenth Plan	2002-03	43597	24176	11215	7790	16196	102974
Tenth Plan	2003-04	43765	25181	11847	8521	15258	104572
Tenth Plan	2004-05	47655	25798	15879	10243	16221	115796
Tenth Plan	2005-06	51065	23077	18460	10653	20181	123436
Tenth Plan	2006-07	59510	24014	26222	12650	21924	144320
Eleventh Plan	2007-08	85698	31328	32490	12950	34830	197296
Eleventh Plan	2008-09	156823	43751	76603	17969	54438	349584
Eleventh Plan	2009-10	139248	58443	61264	17580	37121	313656
Eleventh Plan	2010-11	150170	63844	62301	15081	39106	330502

(All subsidies are Rs in Crores)

(Source: Govt of India)

The potential for technical education can be best explored if it is utilized in serving the purpose of society at all the four levels mentioned before. A case of Punjab is presented hereunder just as an example in that regard. Despite the increase in Minimum Support Price of two major crops – Rice and Wheat – (refer to Table 2) and increases in the subsidies available to the farmers (refer to Table 3), the news about farmers committing suicides have been flowing in. To add to this, there have been a larger number of students graduating out of the technical institutions of Punjab. Most of these graduates seem to be lacking the awareness, engineering vision and capabilities to visualize the problem of the State leave aside solving them. Further, the lack of awareness among *Punjabis* regarding (i) the effects of insecticides & pesticides; and (ii) right understanding regarding the prosperity, is leading the farming class to resort to the excessive usage of fertilizers and exploitation of under-water resources with an objective of increasing their produce. This, in effect, has exposed Punjab (particularly the *Malwa* region) to the dreadful disease of cancer threatening the whole of the Society. Furthermore, the industry in the State seems to be lacking the direction for future development. For example, the technical education has failed to localize and provide winnable solutions for the Steel industry (at Mandi Gobindgarh and Batala), Leather and Sports-goods industry (at Jalandhar), Textile and Auto-components industry (at Ludhiana). Further there has been a failure to set-up food-processing industry in the State, as also a failure to set-up chains of high-tech warehouses to store perishable food products.

These problems identified above may also turn out to be the competitive advantage for the State if a need and competency based model of education can be developed for the state. For technical education, issues like these need to provide basis for recognizing and deciding ‘what to do’ for inclusive development of the State. The geographical and demographic dimensions of Punjab are ideal for agriculture. Therefore, there is great potential for the State to prepare a development model for itself around the agriculture sector. Education can play a lead role in this respect if the educational model is prepared for supporting the sector. All the streams of education can be developed to prepare the graduates who can work towards this end rather than just producing the ‘routine employees’ for multi-national corporations. Figure 1 presents an example of how three streams of technical education (management, electronics and computers engineering, and biotechnology) can be placed in this model. The roles of other streams can also be defined in similar way while designing the model of technical education for the State.

#### Management Graduates

- (i) Study demand-supply gap in agricultural products; (ii) build liaison with the farmers who can produce to plug this gap; (iii) start entrepreneurial projects that can act as a bridge between the farmers and the potential consumers; (iv) involve corporate world to facilitate this marketplace; (v) facilitate the agricultural extension; and (vi) identify and play other roles required towards the sustainable agriculture.

#### Electronics and Computer Engineers

- (i) Build competitive edge via agri-electronics; (ii) ensure speedy and economic access to information for the farmers; (iii) build strong electronic and mobile network for facilitating the marketplace; and (iv) identify and play other roles required towards the sustainable agriculture.

#### Biotechnology Engineers

- (i) Develop better seeds for the crops having potential market; (ii) explore natural methods of agricultural production; and (iii) identify and play other roles required towards the sustainable agriculture.

Figure 1. Placement of three streams of technical education in development of agriculture sector

Applying such a model will lead to digitized green revolution, which promises a catalytic role in national economic development in terms of diversification, enhancing productivity, adding value, capturing markets, mixing farm & off-farm income, entering and creating marketing chains, improving food quality & safety, ensuring healthy society and balancing ecological interest.

## 6. CONCLUSION

The paper presents a holistic view of technical education in India. In order to ensure sustainable development for India in the contemporary global scenario, the paper finds technical education to be one of the core competencies that need to be developed. It is observed that despite the increase in number of educational institutions as also the number of enrolments in higher education programs in the country, the problems of unemployment, poverty and social evils are looming large on the country. There seems to be no linkage between the 'education' being provided in the country and these problems getting solved, which is contrary to the belief expressed by Albert Einstein. In order to provide a real educational solution for all-encompassing development of India, the paper suggests that 'what to do' is the real question for technical education than just 'how to do'. The paper also presents a case-study for ensuring futuristic growth of the technical education in Punjab that revolves around the core strength of the state (i.e. agriculture) and helps achieve happiness through right understanding and prosperity at all the four levels, i.e., Self, Family, Society and Nature.

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